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Two New and Two Known Opecoelid Trematodes from Goatfishes in Japan

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Abstract Two new and two known opecoelid trematodes are described from goatfishes (Mullidae) in Japan. *Dactylostomum tanegashimense* sp. n., found in the pyloric caeca and intestine of *Upeneus bensasi* (?) at Tanega-shima, is characterized by the acetabulum with two pairs of apertural and four pairs of peripheral papillae, and the anterior extent of vitellaria lying near the posterior border of acetabulum. *D. longivesiculum* sp. n., obtained from the pyloric caeca and intestine of *Parupeneus indicus* at Ishigaki-jima, is characterized by having the seminal vesicle longer and more winding, the acetabulum with two pairs of apertural and four pairs of peripheral papillae, and the vitellaria the anterior extremity of which reaches halfway between the ovary and the acetabulum. In addition to the above, some morphological and taxonomic notes are given on *Paropecoelus elongatus* (OZAKI, 1928) (syn. *P. adelongatus* (NAGATY, 1954)) and *P. quadratus* (OZAKI, 1928) comb. n.

This paper describes four species of opecoelid trematodes, two new species of *Dactylostomum* and two known species of *Paropecoelus*, from goatfishes (Mullidae) in Japan. Trematodes were fixed in SCHAUDINN's solution under slight pressure, stained with HEIDENHAIN's hematoxylin and mounted in Canada balsam. Specimens are deposited in the collection of the National Science Museum, Tokyo.

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Family Opecoelidae

Genus *Dactylostomum* WOOLCOCK, 1935

Dactylostomum tanegashimense sp. n.

(Figs. 1-2)

Host. *Upeneus bensasi* (TEMMINCK et SCHLEGEL) (?) (Mullidae).

Site. Pyloric caeca and intestine.

Locality. Tanega-shima, Kagoshima Prefecture.

Date. November 18, 1974.

Specimen No. NSMT-P1 1719 (holotype) and 1721 (6 paratypes).

Description. Based on 7 mature specimens. Body elongate, smooth, lacking accessory sucker, 2.20–3.50 mm long by 0.80–1.10 mm wide; forebody short, 14–22% of total body length. Oral sucker subterminal, 0.10–0.12 mm long by 0.12–0.18 mm wide. Prepharynx absent. Pharynx ellipsoidal, 0.09–0.13 mm long by 0.09–0.11 mm wide. Esophagus short, bifurcating in front of acetabulum. Intestinal caeca simple, fusing to form a cyclocoel near posterior end of body. Acetabulum sessile, possessing 2 pairs of apertural and 4 pairs of peripheral papillae, 0.24–0.26 mm long by 0.25–0.28 mm wide; sucker width ratio 1: 1.39–2.20.

Testes tandem, irregularly indented, 0.16–0.31 mm long by 0.32–0.45 mm wide, in third fourth of body from anterior end. Seminal vesicle tubular, winding, reaching midway between acetabulum and ovary. Cirrus pouch small, ovoid, thick-walled, usually anterior to left intestinal caecum, containing small pars prostatica and short, protrusible cirrus (or ejaculatory duct); prostatic cells present outside the cirrus pouch. Genital pore to left of esophagus; atrium small, shallow.

Ovary 4-lobed, 0.21–0.31 mm long by 0.24–0.41 mm wide, about equatorial. Seminal receptacle absent. LAURER's canal present. Ootype-complex preovarian. Uterus coiled between ovary and acetabulum in intercaecal space; metraterm weakly developed; uterine seminal receptacle present. Many eggs in uterus, not embryonated, 31–39 by 51–62 μm in balsam. Vitelline follicles distributed from near posterior border of acetabulum to near posterior end of body, contiguous around cyclocoel; vitelline reservoir preovarian. Excretory vesicle tubular, extending to ovary; pore terminal.

Discussion. Five species of the genus *Dactylostomum* have been described: *D. gracile* WOOLCOCK, 1935 (type species), *D. vitellosum* MANTER, 1940, *D. caballeroi* MARTIN, 1960, *D. winteri* CABALLERO et CABALLERO, 1971 and *Dactylostoma* [*sic*] *epinepheli* WANG, 1982. The present new species is most like *D. winteri* in the extent of vitellaria and other morphological features, but it differs from the latter by having the seminal vesicle longer, more winding and not surrounded by gland cells, although CABALLERO and CABALLERO (1971, 1976) did not describe and illustrate clearly the arrangement and the number of acetabular papillae in *D. winteri*.

***Dactylostomum longivesiculum* sp. n.**

(Figs. 3–4)

Host. *Parupeneus indicus* (SHAW) (Mullidae).

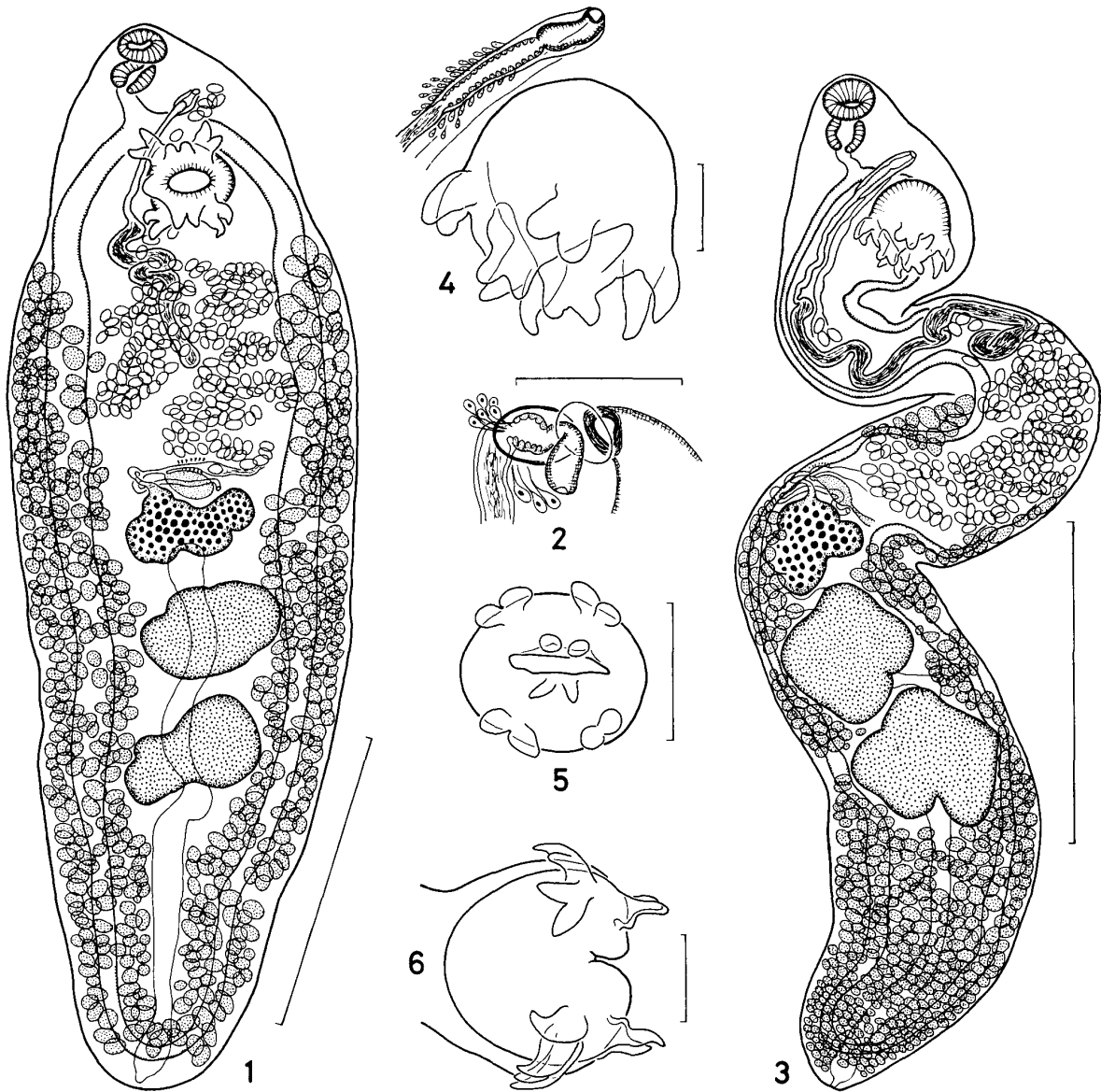
Site. Pyloric caeca and intestine.

Locality. Ishigaki-jima, Okinawa Prefecture.

Date. March 6, 1973.

Specimen No. NSMT-P1 1327 (holotype and 1 paratype).

Description. Based on 2 gravid worms. Body filiform, nonspinous, 3.95–4.05 mm long by 0.50–0.55 mm wide; forebody 10% of total body length; accessory sucker



Figs. 1–2. *Dactylostomum tanegashimense* sp. n. — 1. Holotype (NSMT-P1 1719), ventral view. — 2. Paratype (NSMT-P1 1721), terminal genitalia, ventral view.

Figs. 3–4. *D. longivesiculum* sp. n. — 3. Holotype (NSMT-P1 1327), ventral view. — 4. The same, terminal genitalia and acetabulum, ventral view.

Fig. 5. *Paropecoelus elongatus* (OZAKI, 1928). YAMAGUTI's (1934) specimen (MPM Coll. No. 22137), acetabulum, ventral view.

Fig. 6. *P. quadratus* (OZAKI, 1928) comb. n. OZAKI's unpublished specimen (MPM Coll. No. 30001), acetabulum, lateral view, papillae on opposite side being omitted.

Scale bars: 1 mm in Figs. 1 & 3, 0.1 mm in Figs. 2, 4 & 6 and 0.2 mm in Fig. 5.

absent. Oral sucker 0.11–0.13 mm long by 0.11–0.14 mm wide. Prepharynx absent. Pharynx subspherical, 0.09–0.10 mm long by 0.10–0.11 mm wide. Esophagus short, bifurcating in front of acetabulum. Intestinal caeca making a cyclocoel nearposterior extremity of body. Acetabulum slightly pedunculate, having 2 pairs of apertural and 4 pairs of peripheral papillae, 0.20–0.22 mm long by 0.25 mm wide; sucker width ratio 1: 1.57–2.27.

Testes tandem, irregular in outline, 0.43–0.55 mm long by 0.30–0.45 mm wide, in third fourth of hindbody. Seminal vesicle tubular, long, convoluted, extending halfway between acetabulum and ovary. Cirrus pouch small elongated and contains somewhat long pars prostatica and short cirrus (or ejaculatory duct). Prostatic cells present outside the cirrus pouch. Genital pore sinistrally submedian, prebifurcal; atrium not seen.

Ovary 4-lobed, 0.27–0.30 mm long by 0.25–0.30 mm wide, in about the middle of body. Seminal receptacle absent. LAURER's canal present. Ootype-complex in front of ovary. Uterus undulating intercaecally between ovary and acetabulum; metraterm weakly formed; uterine seminal receptacle present. Many eggs in uterus, not embryonated, 45–55 by 27–35 μ m in balsam. Vitelline follicles extending from a short distance posterior to proximal end of seminal vesicle to posterior end of body, confluent posttesticularly; vitelline reservoir preovarian. Excretory vesicle I-shaped, reaching to ovary; pore terminal.

Discussion. The present new species is most similar to *D. caballeroi* MARTIN, 1960 and *Dactylostoma* [*sic*] *epinepheli* WANG, 1982 in the distribution of the vitellaria, but it differs from *D. caballeroi* by having 4 instead of 8 pairs of peripheral papillae on the acetabulum, and lacking the accessory sucker which was found by PRITCHARD (1966) in front of the acetabulum. Though WANG (1982) incompletely described and illustrated *D. epinepheli*, the present species is different from the former by having the seminal vesicle much longer and much more convoluted.

Genus *Paropecoelus* PRITCHARD, 1966

Paropecoelus elongatus (OZAKI, 1928)

OZAKI (1928) described the acetabulum merely as having finger-like papillae on *Opecoelus elongatus* from the intestine of *Upeneus pleurospilos* (= *Parupeneus pleurospilos*) at Nagasaki. YAMAGUTI (1934), having examined his own specimens of this species detected in the intestine of *U. bensasi* from the Inland Sea, described and illustrated the acetabular papillae as being peripherally located and 8 in number. PRITCHARD (1966) erected the genus *Paropecoelus* to include *Opecoelus*-like species having 8 or 16 peripheral and 0 or 4 apertural papillae, and removed *O. elongatus* to *Paropecoelus*. In fact, we observed 4 small apertural papillae (Fig. 5) besides 8 peripheral papillae figured by YAMAGUTI on his 2 specimens (MPM Coll. No. 22137) in the collection of Meguro Parasitological Museum, Tokyo. Although the type material of this species has not been available for reexamination, we found 11 unidentified and unpublished

specimens (MPM Coll. No. 30001) to be assigned to *P. elongatus* in Dr. Y. OZAKI's collection deposited in the same museum. They were obtained by him from "takasagohimeji" (= *Parupeneus pleurospilos*) (the site of infection not given) at Takamatsu, Kagawa Prefecture, in January 1926. We observed 8 triangular peripheral and 4 digitiform apertural papillae on each of their acetabula. On the other hand, NAGATY (1954) described *P. adelongatus* as a new species from *Upeneoides vittatus* (= *Upeneus vittatus*) in the Red Sea. The acetabulum in *P. adelongatus* has 8 peripheral and 4 digitiform apertural papillae. We consider *P. adelongatus* synonymous with *P. elongatus*.

We obtained 6 specimens of this species (NSMT-P1 974 and 1116), together with 1 specimen of *Paropecoelus quadratus* (OZAKI, 1928) comb. n. (see below), from the intestine of *Parupeneus chrysopleuron* at Fukaura, Ehime Prefecture, on May 23 and December 17, 1972; and 13 specimens of *P. elongatus* (NSMT-P1 1719 and 1721), together with 7 specimens of *D. tanegashimense* sp. n. and 3 specimens of opelcoelid *Pseudopecoeloides carangis* (YAMAGUTI, 1938), from the pyloric caeca and intestine of *U. bensasi* (?) at Tanega-shima on November 18, 1974.

***Paropecoelus quadratus* (OZAKI, 1928) comb. n.**

OZAKI (1928) obtained *Opelcoelus quadratus* from the intestine of *Upeneus pleurospilos* (= *Parupeneus pleurospilos*) at Nagasaki. He described only the acetabulum as possessing finger-like papillae, but PRITCHARD (1966) stated that *O. quadratus* may be placed in *Paropecoelus*, judging from OZAKI's figure. The type material of *O. quadratus* has not been available for reexamination. However, we found 12 unidentified and unpublished specimens (together with the above-mentioned *P. elongatus*; MPM Coll. No. 30001) and 9 unpublished specimens (identified by him as *Opelcoelus*; MPM Coll. No. 30002) from "umihigoi" (= *Parupeneus chrysopleuron*) (the site of infection not recorded) at Kagoshima, both preserved in Dr. Y. OZAKI's collection. These 21 specimens were regarded as *O. quadratus* because their morphological features agreed well with those in OZAKI's original description and figure. They proved to possess 8 pairs of peripheral and 2 pairs of apertural papillae on the acetabulum (Fig. 6). Therefore, *O. quadratus* should be transferred to *Paropecoelus* as suggested by PRITCHARD (1966). Dr. S. YAMAGUTI's collection includes 2 unpublished specimens (determined by him as *O. elongatus*; MPM Coll. No. 22136) from the intestine of "himeji" (= *U. bensasi*) at Taiji, Wakayama Prefecture, on May 27, 1942. These also have 8 pairs of peripheral and 2 pairs of apertural papillae on the acetabulum, and should be *P. quadratus*.

We obtained 3 specimens of this species (NSMT-P1 972 and 974) from the intestine of *Parupeneus chrysopleuron* at Fukaura, Ehime Prefecture, on May 23, 1972 and 14 specimens (NSMT-P1 1718 and 1719) from the intestine of *U. bensasi* (?) at Tanega-shima on November 18, 1974.

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